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May 18, 1997

Mr. William F. Caton  
Office of the Secretary  
Federal Communications Commission  
1919 M Street, NW  
Washington, DC 20554

Re: In the Matter of Amendment of the Commission's Rules Regarding Multiple Address Systems

Dear Secretary Caton,

Enclosed herewith is one (1) original, and four (4) copies of our comments in response to WT Docket No. 97-81.

Sincerely,

COMSEARCH

Christopher R. Hardy  
Vice President  
Microwave and Satellite Services

Enclosures

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**WT Docket No. 97-81**

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### **Designation of 928/952 MHz and 956 MHz to Private Internal Use Services**

In Paragraph 13 of the NPRM, the Commission proposes to designate the existing 928/952/956 MHz bands exclusively for private internal use and requests comments on this proposal. Comsearch agrees that existing internal communication requirements justify a purely private spectrum allocation at the 928/952 and 956 MHz bands. As the Commission correctly points out, these channels are already used extensively by private users.<sup>1</sup> A survey of the Comsearch MAS database and our experience at assigning channels in these band segments further indicates that the spectrum is all but exhausted in many areas of the country. In addition, as evidenced by the approximate 2,500 applications submitted in 1992 by private users in the 932/941 MHz bands, congestion in these band segments is not a new problem.<sup>2</sup>

The Commission's proposal to limit the 928/952 and 956 MHz bands to private use and exclude new subscriber based systems will certainly alleviate some of the competing demand for the spectrum. However, given the current state of congestion in these bands, even if the Commission allocates this spectrum solely for private use, it appears that spectrum availability will be insufficient to adequately accommodate existing and future private user demand.

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<sup>1</sup> See NPRM, Para. 12. About 70% or 5,390 of the approximate 7,700 licenses granted are used by private systems.

<sup>2</sup> See NPRM, Para. 7 and 10.

Several options exist to address the band overcrowding. The Commission could require the relocation of the existing subscriber based systems out of the bands designated for private use. According to the Commission's estimates, this would free up approximately 2,300 licenses.<sup>3</sup> Also, the Commission could be more stringent in verifying construction of facilities within required time periods. More rigorous enforcement of this requirement will help reduce potential "speculative" filings. Another approach to addressing the congestion problem would be to utilize existing spectrum more efficiently through the use of industry recognized analysis techniques. We believe that the spectrum efficiency of site-by-site licensing could be enhanced if a more detailed and comprehensive procedure existed to analyze potential interference between MAS operations. In 1990, the FCC received a Joint Petition for Rule Making (Petition) proposing an alternative approach to the distance protection criteria whereby a detailed interference analysis would be performed to ensure non-interference between systems located at distances less than the established criteria.<sup>4</sup> While we agree wholeheartedly with the concept of the Petition, the procedures and algorithms outlined may be somewhat dated and should be reexamined by the industry. The use of interference criteria, engineering analysis and frequency coordination, rather than the simplified distance based protection criteria currently in place, would allow systems to operate in closer proximity and maximize band utilization. Finally, in addition to the Commissions proposal to

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<sup>3</sup> See NPRM, para. 12. Assuming the remaining 30% of the 7,700 licenses identified in the Commissions estimates are used for subscriber based services.

<sup>4</sup> In the Matter of "Amendment of Part 94 of the Commission's Rules to Implement Technical Criteria for Licensing of Multiple Address System (MAS) Stations"; Joint Petition for Rule Making of the American Petroleum Institute and the Special Industrial Radio Service Association, Inc., May 7, 1990.

reserve a portion of the 932/941 MHz spectrum, 5 channels, for Federal and Public Safety use, we also propose the reservation of additional channels in this band segment for private internal communication systems.

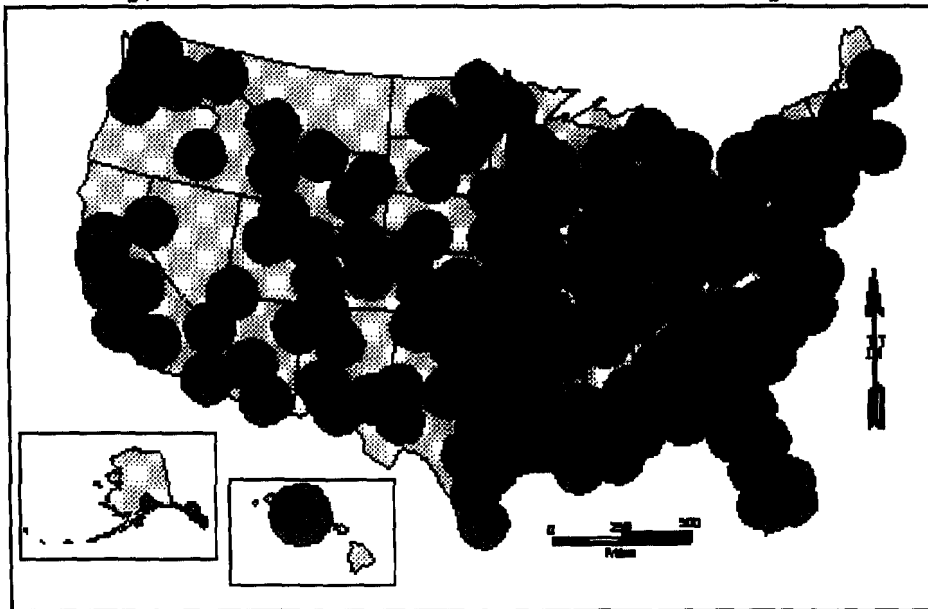
### **Geographic Area Licensing and Treatment of Incumbent Licensees**

In Paragraph 15 of the NPRM, the Commission requests comments on the feasibility of employing geographic area licensing in the 928/959 MHz bands, where a number of systems are already licensed and proposes to protect all co-channel systems operating within the geographic service areas. The Commission also requests comments on employing geographic area licensing in the 928/952/956 MHz private bands in lieu of the existing site-by-site method. The Commission states that geographic area licensees would provide protection to incumbent users by meeting the criteria found in FCC Rule Part 101.<sup>5</sup> We do not believe it is feasible or advantageous to convert to geographic area licensing in these bands because they are already highly congested with incumbent systems. Below is a plot derived from Comsearch's MAS database showing the 145 kilometer interference protection radius around each licensed MAS station for one 12.5 kHz channel. This plot clearly shows that there are only limited areas available that satisfy the prescribed interference protection criteria. We believe this plot is a fairly representative example of the existing utilization of MAS channels in the 928/959 MHz 928/952/956 MHz bands.

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<sup>5</sup> See 47 C.F.R §101.105 (c)(3) which identifies the co-channel distance criteria of 145 km between fixed master stations; 113km between a fixed and a mobile master station; and 81km between mobile master stations or by obtaining short-spacing agreements.

**February, 1997 - 952.3625 and 952.35625 MHz MAS Systems**



**Figure 1: MAS Master Sites Including a 145 km Protection Radius**

The Commission's proposed geographic area licensing approach in the existing bands would create something akin to an "economic and operational serfdom", with incumbent licensees subject to the will and bidding of the geographic area licensee. In these regions, no existing licensee could modify or expand beyond certain boundaries without first gaining permission or paying privilege to the geographic area license holder. The implementation of geographic licensing in congested bands seems ill advised and impractical based upon the likely devaluation of the spectrum at auction and the potential negative economic and operational impact on incumbent users.

Unlike with other point-to-point bands found under Rule Part 101, the current site-specific licensing approach for MAS results in numerous dismissed applications, referred to as untimely filings. In

the point-to-point bands, applications are routinely received and processed by the Commission with minimal dismissals. This is due to an effective prior coordination process among users in which detailed interference analysis is conducted and data is forwarded to affected parties prior to application submittal. When interference concerns are identified during the coordination period, system modifications such as antenna optimization and changes in EIRP can be implemented to satisfy interference criteria. The Commission does not conduct an engineering analysis itself, but relies upon this industry process to remedy potential conflicts prior to application submittal.

In the MAS bands however, where a simplified distance interference criteria is applied, there is no mechanism to address interference concerns and maximize use of the spectrum. This distance criteria limits the use of available spectrum and, when coupled with the extreme demand for spectrum by competing users, creates the incentive to reserve spectrum. This environment negatively affects the prospects for implementation of a successful prior coordination process because of the fear that entities may use the coordination process to warehouse spectrum. The Commission therefore, does not benefit from industry participation, as seen in the other bands, and is required to expend valuable resources analyzing the interference potential of every application.

#### **Proposed Site by Site Licensing Improvements**

Comsearch believes site specific licensing in the 928/952/956 MHz MAS bands should be retained and can be made more effective if the following is implemented:

##### **1. Restrict the bands for private internal use.**

The elimination of the highly competitive subscriber based services from the band will reduce the

potential for the warehousing of spectrum during the coordination and application process.

**2. Enforcement of construction period requirements.**

Enforcement of construction requirements will further minimize the possibility of spectrum warehousing.

**3. Implement an alternative interference criteria/procedure to maximize use of the spectrum.**

As previously stated, the use of an alternative interference criteria will increase spectrum utilization by allowing more systems to operate in a given geographic area.

**4. Implementation of industry agreed upon coordination procedures based upon Part 101.**

This would shift the burden of interference analysis from the Commission to the industry and ultimately reduce the number of untimely/dismissed filings.

**Coordination Procedures Under EA Licensing**

In paragraph 22 of the NPRM, the Commission proposes to address the issue of co-channel interference between adjacent area EA licenses by establishing a maximum signal level strength of  $40\text{dB}\mu\text{V/m}$  at the service area boundaries. The Commission also proposes to require frequency coordination between co-channel adjacent EA licensees. Comsearch agrees that prior coordination and a detailed interference analysis is the only way to ensure operational compatibility between adjacent area co-channel systems.

It is useful to consider operational parameters of typical existing MAS systems with respect to the proposed  $40\text{dB}\mu\text{V/m}$  field strength limit. A typical MAS master station has an EIRP of about 50 dBm (5 Watt transmitter with 13 dBi omnidirectional antenna). Under free space loss conditions,



this transmitter would have to be located 340 miles from the service area boundary to meet 40 dB $\mu$ V/m field strength at the boundary. Obviously, it will therefore be necessary to use a propagation model other than free space path loss to determine compliance with the field strength requirement. The Commission in conjunction with the industry must specify the method of calculation and the propagation model to use. Using the Longley-Rice model, the transmitter would have to be placed nearly 40 miles from the boundary.<sup>6</sup> Locating MAS master stations closer to the boundary would require a shift to lower power, lower antenna height stations, and perhaps using directional antennas. In addition, it is not clear if the 40 dB $\mu$ V/m criteria is intended to apply to the MAS remote station transmissions as well as to the MAS master station transmissions. If so, then detailed engineering of each remote station will be required. Clearly, the engineering effort to design EA licensed MAS systems to meet the field strength requirement will be significantly increased over the design effort necessary for traditional MAS.

We note that the Commission proposes to allow co-primary point-to-point and mobile operations under EA licensing. Field strength limitations as coordination criteria may not be appropriate for these kinds of systems. For point-to-point systems, the high mainbeam gains of the directional antennas result in very large distance separation requirements from the service area boundaries. The resulting spectrum efficiency would be much lower than could be achieved with coordination of

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<sup>6</sup> Using a MAS master station antenna height of 300 feet and a MAS remote station antenna height of 20 feet, the loss above free space for a 40 mile spherical earth path profile exceeds 24 dB for 80% of the time. Therefore the field strength at this distance would be below 35 dB $\mu$ V/m for 80% of the time. A 30 mile path profile is line-of-sight under these conditions and the field strength would well exceed 40 dB $\mu$ V/m. For other path profiles, significantly larger distances may be required to meet the 40 dB $\mu$ V/m requirement.

individual link data. Likewise, it is difficult to engineer mobile transmitters to meet a field strength limit at a service area boundary. While prohibiting mobile MAS equipment from transmitting in another service area is technically feasible, there would be a significant increase in equipment complexity and cost over today's MAS equipment.

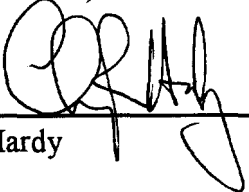
Finally, the Commission should not ignore the adjacent channel interference concerns which are not addressed by the proposed field strength limit. In a complex environment of fixed point-to-multipoint, fixed point-to-point, and mobile radio systems, spectrum efficiency demands effective interference analysis and coordination procedures instead of simple field strength limits or distance criteria.

### **Summary**

Comsearch applauds the Commission's efforts to initiate action on the MAS spectrum allocation at 932/941 MHz. We believe this spectrum is a valuable resource and should not lay dormant for any period longer than is required to ensure that the spectrum is used efficiently and in the public interest. While we agree with the Commission that the 928/952/956 MHz spectrum should be a purely private allocation, we believe that this action alone will not support the existing and future demand for private MAS operations. If the Commission decides to auction the 928/959 MHz spectrum, we believe that the Commission must further address interference protection to incumbents. Due to the existing congestion, we believe the Commission should maintain site-by-site licensing in the 928/952/956 MHz bands. Site-by-site licensing could be improved if a more detailed interference analysis and criteria were used in lieu of the existing distance criteria. While

we agree with the Commission's goal to provide maximum flexibility in the use and deployment of geographically licensed systems, interference concerns cannot be underestimated or trivialized. Procedures must be adopted that ensure efficient use of all of the bands and which minimizes the potential for harmful interference.

Respectfully Submitted,  
COMSEARCH

Prepared By:   
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